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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/902,408	07/10/2001	Gerald T. Mearini	0937.0017	8259

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EXAMINER


BUEKER, RICHARD R

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/902,408	MEARINI ET AL.	
	Examiner	Art Unit	
	Richard Bueker	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on April 8, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>Oct. 15, 2001</u> . | 6) <input type="checkbox"/> Other: _____ |

Applicant's election of claims 1-9 in the reply filed on April 8, 2004 is acknowledged. Applicant's traverse of the restriction requirement with respect to Groups I and II is convincing and this part of the restriction requirement is withdrawn. Claims 1-15 will be examined together. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement with respect to Group III (claims 16-20), the election has been treated as an election without traverse of apparatus claims 1-15 (MPEP § 818.03(a)). Claims 16-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 8, 2004.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: the reference characters shown in Figs. 1A and 1B . Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Figures 1A and 1B should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claims 1 and 11-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification does not provide an enabling disclosure for claim 1 and 11-15, which require the use of an optical thickness monitor in combination with a quartz crystal monitor. The only description of such a combination is in applicants' description of the prior art. There is no disclosure relating to how such a combination of thickness monitors can be implemented in the apparatus described in applicants' Figs. 2-5. Also, the specification does not provide an enabling disclosure for the claim 12 limitation of "the monitors being located on the disk", wherein "the disk" is "a rotatable disk", and "the monitors" are "a dedicated quartz crystal monitor; and, an optical thickness monitor" as recited in claim 11. Also, the specification (see Fig. 2A and particularly Fig. 2B) show that the QCM 20 is not located on disk 34. Therefore the specification does not provide

an enabling disclosure for the claim 12 limitation of "the monitors being located on the disk". The specification also fails to disclose the nature of the "multi-crystal quartz crystal monitor" recited in claim 1.

Claims 6-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 6, "the monitor" lacks proper antecedent basis, and should be changed to "the thickness monitor". In claim 7, the phrase "the substrate" in the singular is indefinite because claim 6 recites plural substrates. In claim 10, "the fixture" in the singular (both occurrences) is indefinite because claim 10 recites multiple fixtures. In claim 12, "the monitors" lacks proper antecedent basis.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 10 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Zhao (6,039,806). Zhao (see Figs. 1-5) discloses a fixture and substrate assembly for production of optical filters including

Art Unit: 1763

a thickness monitor, rotating member, fixture shutter, substrate and means to rotate the fixture. The fixture of Zhao has an inherent capability of being a "high yield" fixture.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (6,039,806) taken in view of applicants description of the prior art (applicants' Figs 1A and 1B). Zhao does not specifically state that his substrate chuck (50 of Fig. 4A) can be in the shape of a disk. Applicants' description of the prior art shows that it was known in the prior art that a PVD coating process can be performed successfully by using a substrate holder in the shape of a disk. For that reason it would have been prima facie obvious to utilize a disk shaped substrate chuck in Zhao's apparatus.

Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (6,039,806) taken in view of applicants' description of the prior art, for the reasons stated in the rejection of claim 3 above, and taken in further view of Holland (4,311,725). Holland (see Figs. 5 and 6 and abstract) teaches that film thickness can be more accurately measured using an optical monitor in combination with a quartz crystal monitor (QCM). It would have been obvious to one skilled in the art to modify the apparatus of Zhao by using a QCM in addition to and in combination with the optical monitor of each fixture of Zhao, for the desirable purpose of achieving more accurate measurement as taught by Holland.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (6,039,806) taken in view of applicants' description of the prior art and Holland (4,311,725) for the reasons stated in the previous paragraph rejection, and taken in further view of Bloom (3,573,190) and Bassan (3,381,660). Bloom (3,573,190) teaches

Art Unit: 1763

(see Fig. 2 and col. 2, lines 43-51) the use of a dual plate shutter as a substrate fixture shutter. The shutter of Bloom can reasonably be considered a "clam shell shutter". Also, Bassan (Fig. 1 and col. 2, lines 1-37) teaches the use of a "clam shell shutter" to control the amount of coating material that deposits on a substrate. Bassan teaches that his two part shutter has desirably rapid response. It would have been prima facie obvious to use a two-part shutter of the type taught by Bloom and or Bassan as the fixture shutter of Tomofuji or applicants' APA, because Bloom and Bassan teach that such a shutter will successfully shield a substrate and Bassan teaches that it has a desirably rapid response time. Regarding claim 6, the substrates of Zhao are located concentrically about "the monitor". Regarding claim 7, applicants' APA (page 3, lines 15-20) indicates that substrates are conventionally divided into a grid of dies.

Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (6,039,806) taken in view of applicants' description of the prior art, Holland (4,311,725), Bloom (3,573,190) and Bassan (3,381,660) for the reasons stated in the previous paragraph rejection, taken in further view of Ogure (5,630,881). Ogure teaches that a magnetic induction rotating means can usefully be used as the rotation means of a substrate holder in a coating apparatus when high speed rotation of the substrate is desired. It would have been prima facie obvious to one skilled in the art to use a magnetic induction rotating means to provide the high speed rotation suggested by Zhao, because Ogure teaches that magnetic induction can successfully provide the high speed rotation desired by Zhao.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (6,039,806) taken in view of applicants' description of the prior art, Holland (4,311,725), Bloom (3,573,190), Bassan (3,381,660) and Ogure (5,630,881) for the reasons stated in the previous paragraph rejection of claims 8 and 9, and taken in further view of Kendrick (5,025,664), who teaches that it was conventional in the art to use a multi-crystal array as a QCM. It would have been obvious to use a multi-crystal QCM as the QCM suggested by Holland, because Kendrick teaches that it reduces down-time for a vacuum coating apparatus.

Claim 2 is rejected under 35 U.S.C. under 35 U.S.C. 103(a) as obvious over Tomofuji (6,142,097) or applicants' admitted prior art (APA) (Figs. 1A and 1B) taken in view of Barnett (4,816,133). Tomofuji (see Fig. 8) and applicants' description of the prior art show that it was known in the prior art to provide a substrate holding fixture with a thickness monitor, a rotating member and means to rotate the substrate. A shutter is not shown. Barnett, however, teaches that it is desirable to provide a shutter (see Figs. 3 and 4 and col. 4, lines 6-18 of Barnett) to control the amount of material deposited on the substrate. It would have been obvious to provide the substrate holder of Tomofuji or applicants' APA with a shutter to control deposition on the substrate as taught by Barnett. Regarding the recitation of a "high yield fixture" in the preamble of claim 2, it is noted that this limitation is a recitation of intended use that does not so limit the apparatus claim. Also, the apparatus of Tomofuji and applicants' APA would be expected to provide a high yield for traditional optical filters with less stringent thickness requirements than the DWDM filters discussed in applicants' specification.

Claims 2, 3, 4 and 10 are rejected under 35 U.S.C. under 35 U.S.C. 103(a) as obvious over Tomofuji (6,142,097) and applicants' admitted prior art (APA) (Figs. 1A and 1B) taken in view of Barnett (4,816,133) and Zhao (6,039,806). Tomofuji (see Fig. 8) and applicants' description of the prior art show that it was known in the prior art to provide a substrate holding fixture with a thickness monitor, a rotating member and means to rotate the substrate. A shutter is not shown. Barnett, however, teaches that it is desirable to provide a shutter (see Figs. 3 and 4 and col. 4, lines 6-18 of Barnett) to control the amount of material deposited on the substrate. It would have been obvious to provide the substrate holder of Tomofuji or applicants' APA with a shutter to control deposition on the substrate as taught by Barnett. Also, Zhao teaches (col. 5, lines 18-38) that a higher speed of rotation of a substrate fixture per se improves thickness distribution of a deposited coating. It would have been obvious to one skilled in the art to provide means to rotate the substrate holder of Tomofuji or applicants' APA at a higher speed for the desirable purpose of improving thickness distribution. Regarding claims 3 and 4, it is noted that both Tomofuji and applicants' APA include a quartz crystal monitor (QCM) as a thickness monitor.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomofuji (6,142,097) and applicants' admitted prior art (APA) (Figs. 1A and 1B) taken in view of Barnett (4,816,133) and Zhao (6,039,806) taken in further view of Holland (4,311,725). Holland (see Figs. 5 and 6 and abstract) teaches that film thickness can be more accurately measured using an optical monitor in combination with a quartz crystal monitor (QCM). It would have been obvious to one skilled in the art to modify the

Art Unit: 1763

apparatus of Tomofuji and applicants' APA by using an optical monitor in addition to and in combination with the QCM, for the desirable purpose of achieving more accurate measurement as taught by Holland.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomofuji (6,142,097) or applicants' admitted prior art (APA) (Figs. 1A and 1B) taken in view of Barnett (4,816,133) and Zhao (6,039,806) for the reasons stated in the previous paragraph, and taken in further view of Bloom (3,573,190) and Bassan (3,381,660). Bloom (3,573,190) teaches (see Fig. 2 and col. 2, lines 43-51) the use of a dual plate shutter as a substrate fixture shutter. The shutter of Bloom can reasonably be considered a "clam shell shutter". Also, Bassan (Fig. 1 and col. 2, lines 1-37) teaches the use of a "clam shell shutter" to control the amount of coating material that deposits on a substrate. Bassan teaches that his two part shutter has desirably rapid response. It would have been prima facie obvious to use a two-part shutter of the type taught by Bloom and or Bassan as the fixture shutter of Tomofuji or applicants' APA, because Bloom and Bassan teach that such a shutter will successfully shield a substrate and Bassan teaches that it has a desirably rapid response time. Regarding claim 6, Tomofuji and applicants' APA provide their substrates concentrically about a QCM. Regarding claim 7, applicants' APA (page 3, lines 15-20) indicates that substrates are conventionally divided into a grid of dies.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomofuji (6,142,097) or applicants' admitted prior art (APA) (Figs. 1A and 1B) taken in view of Barnett (4,816,133), Zhao (6,039,806), Bloom (3,573,190) and Bassan

(3,381,660) for the reasons stated in the previous paragraph, and taken in further view of Ogure (5,630,881) (see Fig. 1) who teaches that a magnetic induction rotating means can usefully be used as the rotation means of a substrate holder in a coating apparatus when high speed rotation of the substrate is desired. It would have been prima facie obvious to one skilled in the art to use a magnetic induction rotating means to provide the high speed rotation suggested by Zhao, because Ogure teaches that magnetic induction can successfully provide the high speed rotation desired by Zhao. Regarding claim 9, the recitation of a disk "adapted to" rotate at greater than 2400 RPM does not require the apparatus to actually rotate at that speed. Also, a higher speed is prima facie obvious in view of Zhao's teaching that a higher rotation speed per se improved thickness uniformity.

Regarding the Rodgers patent (6,649,208) cited below, it is noted that the filing date of Rodgers is after the filing date of applicants' provisional applications from which applicants claim priority. It is also noted, however, that applicants can receive benefit of this earlier date only for those claims whose subject matter is fully supported by the disclosure of the provisional application priority documents. Therefore, Rodgers qualifies as prior art for those claims which include subject matter that was not disclosed in applicants' provisional applications. Of the claims presently being examined, claims 1, 9 and 11-15 are not fully supported by applicants' provisional applications.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomofuji (6,142,097) or applicants' admitted prior art (APA) (Figs. 1A and 1B) taken in view of Barnett, Zhao (6,039,806), Bloom (3,573,190), Bassan (3,381,660) and Ogure

(5,630,881) for the reasons stated in the previous paragraph, and taken in further view of Rodgers (6,649,208). Rodgers teaches (col. 9, lines 20-43) that it is desirable to rotate a substrate fixture at greater than 2400 RPM to improve thickness uniformity, and for that reason it would have been obvious to one skilled in the art to provide means to rotate the substrate fixture of Tomofuji or applicants' APA at the rotation speed suggested by Rodgers.

Claim 11 is rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Rodgers (6,649,208). Rodgers discloses (see the Figs.) a high speed substrate assembly for use in line-of-sight deposition including multiple independent fixtures, shuttering means, rotating means, an optical thickness monitor and a quartz crystal monitor. The quartz crystal monitor is inherently or at least obviously a "dedicated" quartz crystal monitor as recited in claim 11.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rodgers (6,649,208) taken in view of Ogure (5,630,881) and Kendrick (5,025,664). Rodgers discloses a fixture for producing DWDM optical filters comprising a disk adapted to rotate at greater than 2400 RPM (col. 9, lines 20-42), multiple substrates located concentrically about a quartz crystal thickness monitor (see Fig. 4, for example), an optical thickness monitor (Figs. 2 and 3) and a clam shell shutter (Fig. 4). Rodgers does not discuss the use of a magnetic induction rotation mechanism or a multi-crystal QCM. Ogure, however, (see Fig. 1) teaches that a magnetic induction rotating means can usefully be used as the rotation means of a substrate holder in a coating apparatus

when high speed rotation of the substrate is desired. It would have been prima facie obvious to one skilled in the art to use a magnetic induction rotating means to provide the high speed rotation suggested by Rodgers, because Ogure teaches that magnetic induction can successfully provide the high speed rotation desired by Rodgers. Also, Kendrick (see col. 1, lines 1-50) teaches that multi-crystal QCMs are well known in the prior art to be desirable for reducing down time of a vacuum coating apparatus. It would have been prima facie obvious to use a multi-crystal QCM in the apparatus of Rodgers because Kendrick teaches that multi-crystal QCMs desirably reduce down time in a vacuum coating apparatus of the type disclosed by Rodgers.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao (6,039,806) taken in view of applicants' APA, Kendrick (5,025,664), Ogure (5,630,881), Bloom (3,573,190) and Bassan (3,381,660). Zhao discloses a fixture for producing DWDM optical filters comprising a disk adapted to rotate at high speed, and multiple substrates located concentrically about a thickness monitor (see monitor 46C of Fig. 3 and col. of Zhao). Zhao does not discuss the use of a QCM as his monitor 46C. Both of applicants' APA and Kendrick, however, teach that a QCM is a useful for measuring film thickness. Applicants' APA indicates that a QCM is known to be more accurate than an optical sensor. Regarding the use of a multi-crystal QCM, Kendrick makes clear that it was known in the art to be desirable to use a multi-crystal model instead of a single crystal QCM to reduce down time. Therefore, it would have been obvious to one skilled in the art to substitute a conventional multi-crystal QCM thickness monitor for the optical monitor 46C of Zhao, to gain a more accurate thickness monitor that

Art Unit: 1763

reduces down time of the vacuum coating chamber. Also, it would have been prima facie obvious to one skilled in the art to use a magnetic induction rotating means to provide the high speed rotation suggested by Zhao, because Ogure teaches that magnetic induction can successfully provide the high speed rotation desired by Zhao. Also, it would have been prima facie obvious to use a two-part shutter of the type taught by Bloom and or Bassan as a shutter in Zhao's apparatus, because Bloom and Bassan teach that such a shutter will successfully shield a substrate and Bassan teaches that it has a desirably rapid response time.

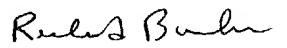
The references made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (

PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Richard Bueker
Primary Examiner
Art Unit 1763